

The global petroleumscapes in the Dutch Randstad

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5 The global petroleumscape in the Dutch Randstad

Oil spaces and mindsets

Carola Hein

Introduction

As a polycentric conurbation in the north-west of the Netherlands, the Randstad is a complex structure that has evolved over centuries under the influence of diverse and shifting actors. It overlaps with numerous economic spaces, including ones for oil. It is home to the Amsterdam Rotterdam Antwerp oil spot market (ARA) that includes Amsterdam, home for refined petroleum products; Rotterdam, the centre for crude; and, crossing the Belgian border to the south, Antwerp, one of the largest petrochemical industrial complexes in the world. This chapter explores how oil companies with the support of public planning and private corporations have co-shaped the landscapes and mindscapes of the Randstad through transformation, transport, consumption, administration, and promotion of petroleum in parallel with other actors. They created what I call a *petroleumscape* that consists of diverse evolving spatial patterns and built forms as well as mindsets.¹ These oil spaces are only partly incorporated into the imaginary of the Randstad. When citizens and tourists think of cities in the Netherlands, few might think of petroleum. Instead, they will probably visualize historic medieval centres with canals and windmills.

Through a close investigation of the multiple dimensions of oil in the Randstad, the chapter highlights the ways in which oil interests have intersected with private and public planning and design paradigms over the last 150 years, establishing patterns that influence spatial practice, including heritage decisions and urban transformation in the future. The chapter further argues that in parallel with the physical construction of oil landscapes the oil companies (with the help of car manufacturers and other enterprises including design) promoted the emergence of a very different mindscape. Distributing free road maps and brochures, for example, that advertise the use of cars to discover the natural landscapes and historical cities in faraway locations, they pursued a major advertisement campaign aimed to change people's behaviours and lifestyles. Highlighting the impact of oil on different parts of the built environment, this chapter raises new questions about spatial formation

in the Randstad. The chapter does not claim to provide a complete history: it focuses on Rotterdam and the South Western corner of the Randstad and serves as a call for an integrated study of oil networks and their expression in landscapes and mindscapes on a larger scale.

A comprehensive investigation of the interconnected physical reality of oil and its appearance is ongoing, and the importance of space is receiving more and more attention (Hein, 2010; Hein, 2013; Hein, 2016; Hein, 2017; Hein, 2018a). Diverse groups of scholars concern themselves with select aspects of oil spaces—economic geographers may study oil flows, planning historians investigate urban structures, and cultural historians may consider the lived reality of oil. Historians of the built environment have recognized the impact of oil on a region in specific historic investigations of industrial structures, headquarter buildings, or gas stations, but have yet to explore these impacts in context (Hubbard, 1967; Walker, 1984; Yergin, 1991; Black, 2012). Understanding the changing fabric of the Randstad in light of oil-related structures provides insights on factors external to recognized spatial planning and instead relate to economic policies that drive spatial development. In most instances, oil companies and stakeholders are not planning agents per se, but the flows and the interests related to petroleum have influenced planning practice, directly and indirectly in response to the changing urban environment.

Through four sections—industrial, retail, ancillary, and imaginary—the chapter examines how oil companies and the public sector established the foundations for the Randstad oil cluster in the early years of the industry (from 1862 to the Second World War) and established a petroleumscape that shapes spatial practices and mindsets until today. To highlight how different layers of the petroleumscape have influenced each other, a series of analytical maps shows the various phases in which the industrial, infrastructural, administrative, retail, and ancillary spaces (spatial layers of the petroleumscape) have grown in the era of the car, specifically comparing 1910, 1940, 1970, and 2000 (see Figure 5.1a–d). These maps are based on rich source material, ranging from secondary sources to archival material and telephone book listings of gas/petrol stations. In making the maps we focused on the big picture and broad trends rather than on each location and its historical development. The maps are meant to provoke in-depth follow-up studies. The maps show that installations of oil storage, refining and transport have ‘standing power’ once established. As the international professional services company Ernst and Young put it: ‘Old refineries rarely die’ (Ernst & Young, 2012; Hein, 2018b). The fourth section explores the ways in which oil companies have used the landscape in their advertising, focusing on the benefits of oil use rather than the landscape of production. A better understanding of how oil has shaped the spaces and imaginaries of the Randstad helps understand the challenges and opportunities of the ongoing, much-needed energy transition—its spatial, social, and cultural elements.

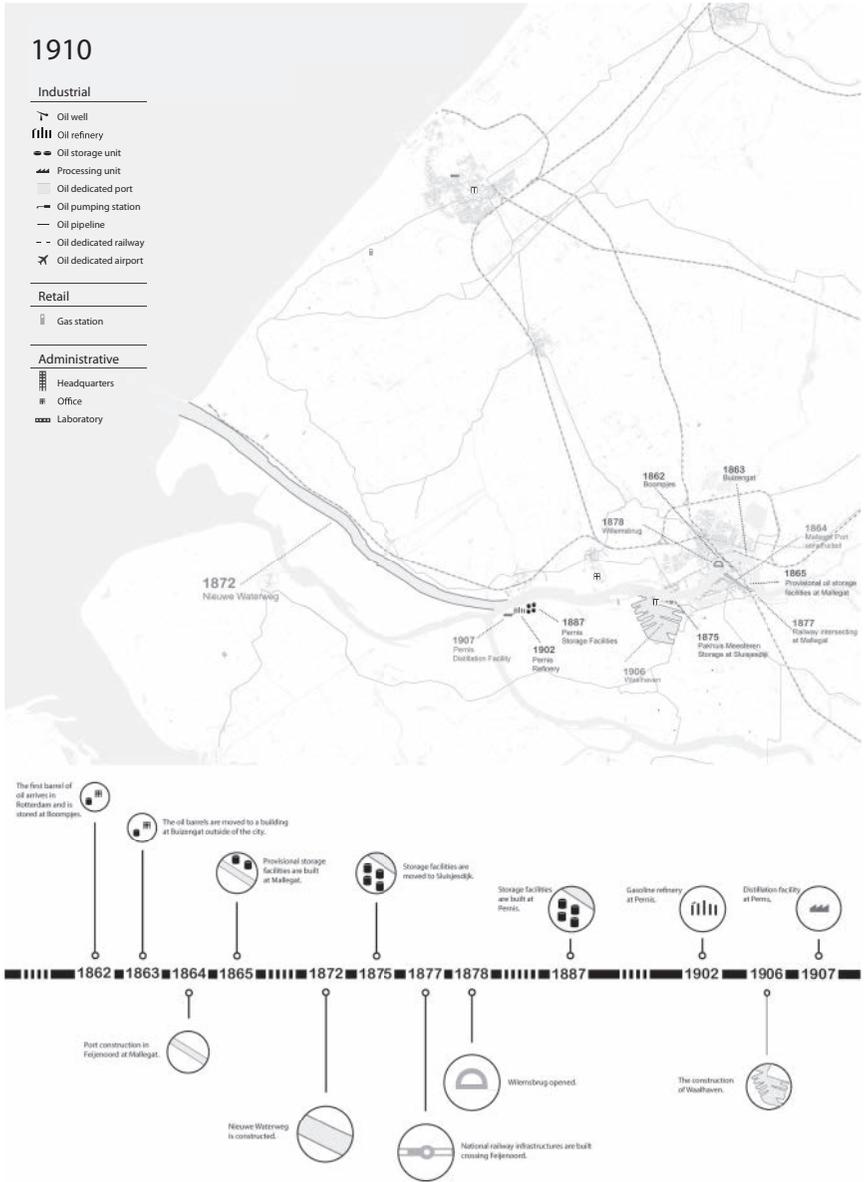


Figure 5.1(a/d) Maps of the petroleumscape of the Rotterdam The Hague area in 1910, 1920, 1940 and 2000.

Source: Carola Hein, Arnaud de Waijer.

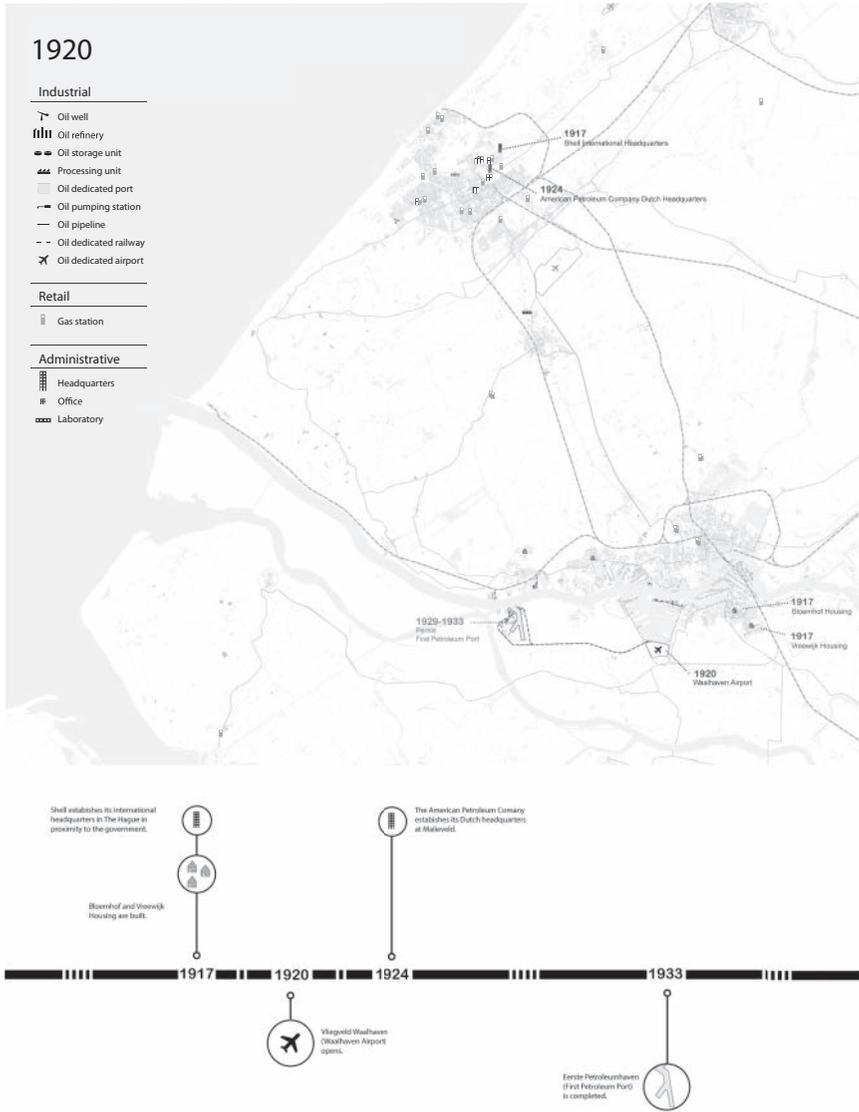


Figure 5.1(a/d) (Continued)

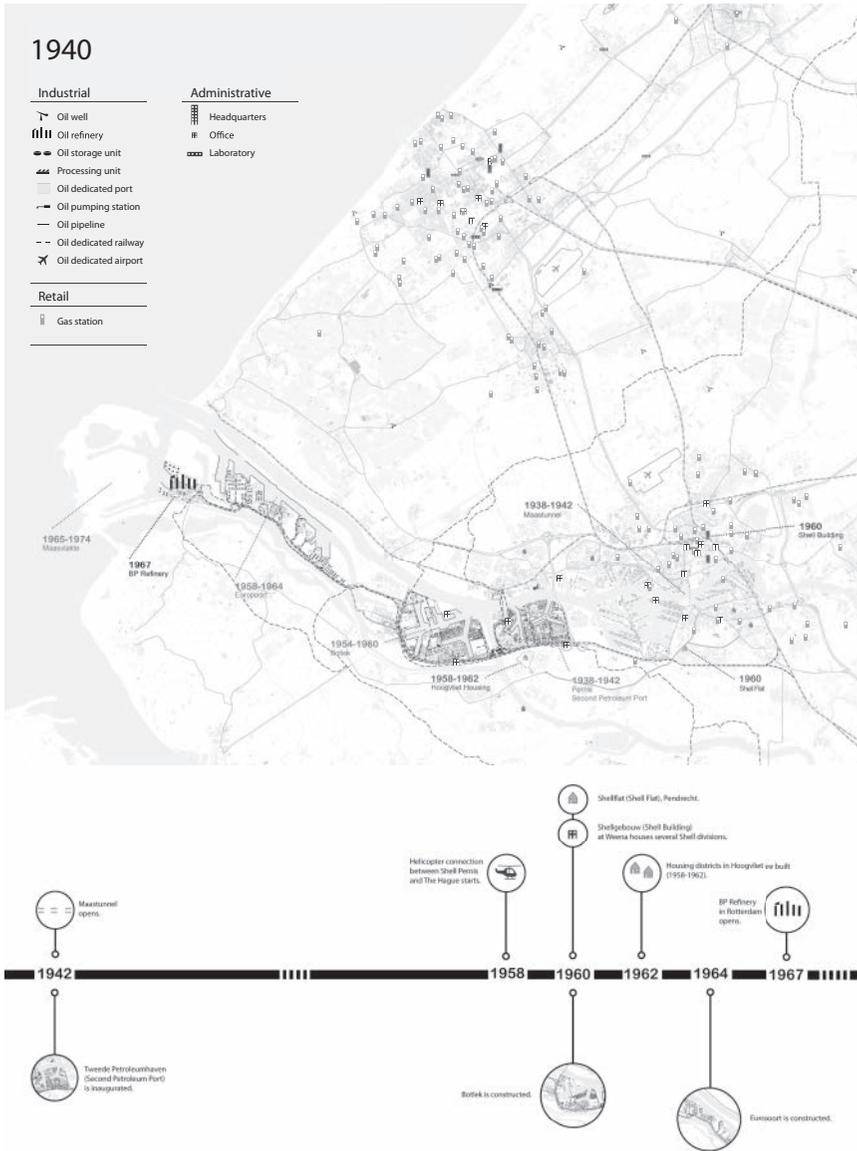


Figure 5.1(a/d) (Continued)

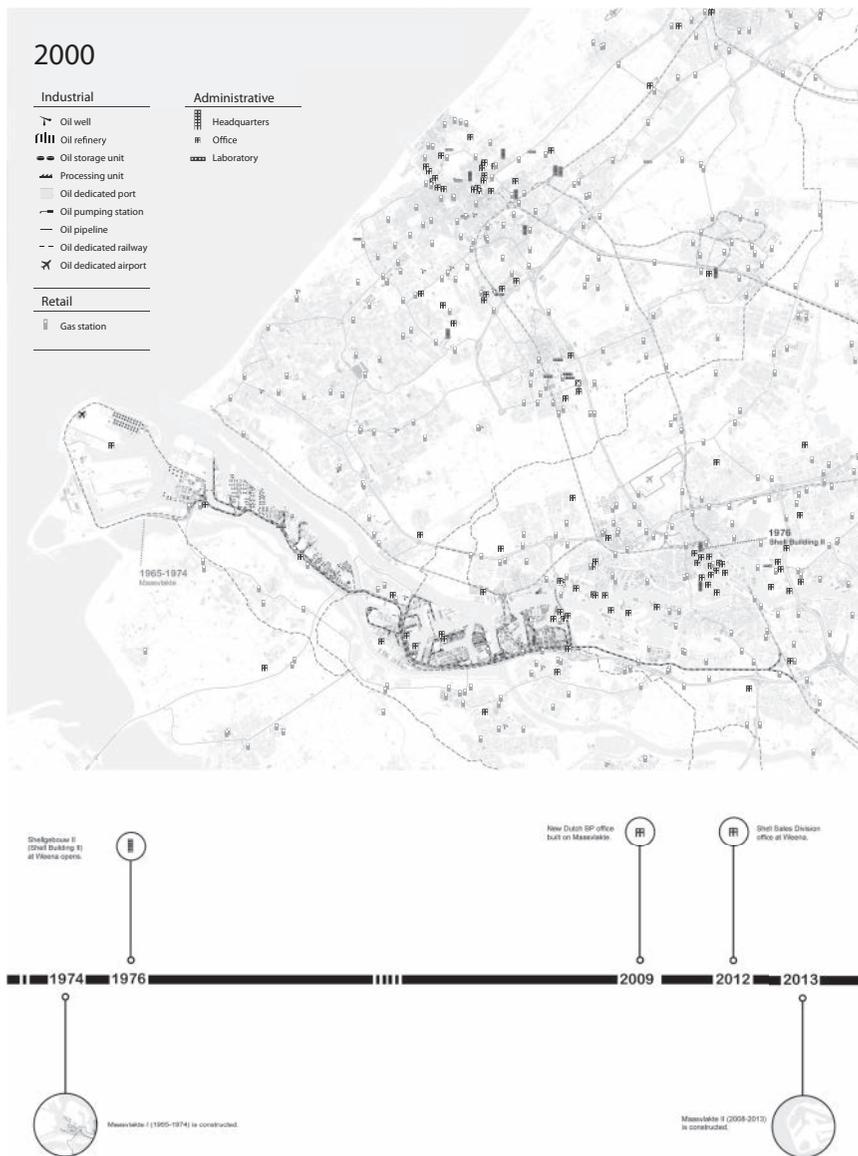


Figure 5.1(a/d) (Continued)

The industrial petroleumscape in the Randstad: building the largest oil port of Western Europe

The first landscape of oil is the industrial footprint of oil, its storage, transformation, and transport. These installations are identical around the globe but largely invisible and inaccessible to the population. They are expansive in the Rotterdam port and clearly visible from the air: port facilities, storage tanks, refineries, pipelines, and other infrastructure spanning from the inner city to the tip of the port, the Maasvlakte II. The production sector is huge in scale with some 5,300 ha for industrial sites and 1,500 kilometres of pipelines within the port, and very costly. Its impact on planning decisions is high, but its visibility for the general public is low and mostly hidden from everyday experience. Most citizens only experience the industrial petroleumscape on the edge of their everyday experience. They might glimpse a refinery or storage tanks at the side of a highway, and they might see a passing train or ship or view the harbour from the air or see the distant light emissions during the night. But little of the larger industrial structure is visible in the everyday environment or part of everyday life (Sijmons *et al.*, 2014). As a result, the huge industrial landscape has little impact on the citizen's mindscape. Some of its infrastructure, notably pipelines (including NATO pipelines) is underground and not visible to the eye—unless a careful observer traces pipeline markers, follows patterns of melted snow across agricultural areas, or accesses relevant data sets. Other parts of the infrastructure, such as important rail and highway networks, are shared with general users and not easily identifiable as part of oil networks either. Other oil-related elements, such as intensive farming in greenhouses that is widely spread in the Netherlands, is also largely dependent on oil (and gas), but rarely associated with the oil industry.

As the map of 1910 shows, it is in the port that oil first arrived in the Netherlands. Small businesses in Rotterdam, Amsterdam, and Antwerp were prominent from the 1860s to the 1880s when American oil entered the European market and as Rotterdam's port evolved into a turntable and transit point for oil heading to the rapidly industrializing areas in western Germany. The use of kerosene to light lamps was growing, creating a market for newly available petroleum. As early as 1862, several hundred barrels and crates of petroleum from America arrived in the Rotterdam port (Loohuis, 1952; Janssen, 1999). Traders in Rotterdam and Antwerp as well as in Hamburg, Bremen, Liverpool, Cork and Marseille had been among the first to import petroleum to Europe, laying the bases for the development of these cities as oil markets. Oil firms were small at the time and focused on transport, storage, and resale as they searched for the fastest and safest transport chains and refining processes. The first shipment of oil was stored by the company *Pakhuismeesteren* in the heart of Rotterdam, paying little attention to its explosive qualities.² Only a year later, in 1863, petroleum imports had reached 17,500 barrels of direct and 7,200 of indirect import (Loohuis, 1952). The dangers of the new product—notably flammability and water pollution—became better known

which led to its storage outside the city (and similar decisions were made in other cities around the world).

Competition among the port cities in the Randstad and Belgium was fierce in this early period. In 1864 the New York Herald reported growing sales in Rotterdam and moderate activity in Amsterdam.³ In 1865 Rotterdam received 533,000 gallons, but this was less than half the amount shipped to Bremen or Hamburg, and much less than the over 4m shipped to Antwerp.⁴ Indeed, in these early years, Antwerp held the dominant position. But demand in the German and Swiss hinterland spurred the import of oil through Rotterdam in competition with these other ports, alternatively transported via rail and ship. The amount shipped to Rotterdam increased rapidly. Storage facilities had to be expanded and improved. By 1867, imports (107,000 barrels) were double that of 1866 (Loohuis, 1952). In 1870, the Provincial Executive agreed upon the extension of the Rotterdam municipality because of interest in maintaining the port area within the city limits, against the opposition of the municipalities of Charlois and Katendrecht (Schoor, 2013). The opening of the shipping canal, the Nieuwe Waterweg, connecting Rotterdam directly to the North Sea in 1872 facilitated access for the growing number of steamships that transported petroleum and brought about the request for a petroleum port with sound rail and road connections to the German hinterland.

The quick growth of the petroleum trade, and the need for dedicated facilities, necessitated a close collaboration between elite merchants and the municipality. Their work together helped Rotterdam develop into one of the key European oil ports within about a decade of the first oil drilling in Titusville, Pennsylvania in 1859. In Rotterdam, the De Monchy family of merchants owned the firm *Pakhuismeesteren* and emerged as one of the drivers of the Rotterdam port development (Schijf, 2011). They had important political connections, including positions on the Town Council and the Chamber of Commerce. The economic elite was closely associated with the main political forces, including ones driving Rotterdam's annexation of Charlois.⁵ The storage of oil was transferred to a new location in the newly built Charlois area by 1876 (near Sluisjesdijk) a location fully in control of *Pakhuismeesteren* (Loohuis, 1952; Van de Laar, 2000; De Klerk *et al.*, 2008). After several years of negotiations in February 1895, Charlois became officially part of Rotterdam and the core of the oil storing and trading (Schoor, 2013). By that time, the Randstad, where railways had first connected the main cities on the Western shore, saw the construction of railway lines towards the border, lines that would also come to serve the oil industry. These choices created the foundation for the long-term development of Rotterdam as oil port just at a time when new global players in oil emerged.

Advances in shipping, transporting and refining, and the advent of major companies who gained control of the entire production and distribution chain extensively reshaped the port and the oil business. Their interests connected various parts of the world through their commodity flows, putting

their imprint also on the Randstad. These companies, led by the American Standard Oil Company that monopolized oil interests at the time, intervened also in Europe. In 1885, foreign companies challenged the 23-year monopoly of *Pakhuismeesteren* and started to compete for land allocation in the Rotterdam petroleum port. By 1890, Standard Oil had secured large firms in Bremen and Hamburg and organized them into a stock company, the German American Petroleum Company (DAPG: *Deutsch-Amerikanische Petroleum Gesellschaft*). One year later, Standard Oil, together with four companies from Antwerp and Rotterdam, set up the American Petroleum Company (APC), with headquarters in both cities.⁶ Around the same time, several other oil companies settled in the port, including in 1901, the Koninklijke Olie—one of the predecessors of the Royal Dutch Shell (created in 1890 and consolidated in 1907) (Gabriels, 1990). The city on the Maas had emerged as the main Dutch petroleum centre, outpacing Amsterdam, where the local petroleum harbour company had unsuccessfully tried to keep the business to themselves.⁷ The presence of oil expanded in the port throughout the nineteenth century, promoting also the construction of select rail and water infrastructures; its impact on built form in the cities remained low though as lighting oil replaced other forms of light.

If demand for lighting oil established Rotterdam as a major oil port, the rapidly growing new demand for benzine as a car fuel triggered its explosive growth. Royal Dutch quickly picked up on the new oil age geared towards cars and built a gasoline refinery in Pernis in 1902. First plans for a large oil port in newly to be annexed Pernis emerged in 1913, but it took more than a decade and pressure from the Royal Dutch to finish what would be called the first petroleum harbour (Van de Laar, 2000). Created in 1907 the *Bataafse Petroleum Maatschappij*, a subsidiary of Royal Dutch Shell, also explored for oil fields in the Netherlands and started drilling—an activity that continues until today.⁸ The company, predecessor to the *Nederlandse Aardolie Maatschappij* (NAM), established by Shell and Esso built residences in Hoogvliet near the Rotterdam oil port area for their employees (Van der Schoor, 2013).⁹ By 1940, another date captured in the maps, Rotterdam was the third largest port of the world after New York and London (Borghuis, 1987; De Goey, 1990). Oil storage was a major price in the Second World War. The war faring parties tried to keep the German enemy from getting their hands on oil, destroying storage tanks, that had not been bombed (Gabriels, 1990).

In the post-war period, the oil industry brought new demands and opportunities to Rotterdam. The Rotterdam port grew in size, and Pernis, Botlek, and Europoort stand out as the main areas under control by six multinational oil companies. America lost its status as primary oil supplier. With de-colonization in Asia and Africa, oil companies (and their home countries) no longer had access or control over oil resources and had to rearrange their business. Most of the oil started coming from the Middle East; with nationalization of oil there and the creation of OPEC in 1960, demand increased, supply was reduced, and prices rose (Bauer and De Boer, 1981). Post-war

development took the expansion of oil to a new scale. Cargo ships grew in size, and some ports, such as Antwerp, accessible only through an estuary (or Amsterdam, a closed port only accessible through a coastal lock complex), could no longer accommodate them, much unlike Rotterdam with its direct access to the sea.

The Rotterdam port grew rapidly in the post-war period as shown in the map of 1970, thanks to its geographical advantage, seaport infrastructure, collaboration among its corporations, subventions promoting investment, a sufficient labour market, and growing demand. The port grew so quickly that the province could not keep up with its growth in regional spatial plans. Meanwhile, new types of refining processes created diverse novel products and further demand for them, notably in the field of plastics. Since the 1960s, the chemical industry has blossomed, indicating another major change in the petroleum industry. According to Dutch historian De Goey, the construction of refining compounds (petrochemical complexes) was the major difference between the pre- and post-war (De Goey, 1990; De Goey, 2004; Van de Laar and Loyen, 2004). The oil crisis of the 1970s seems to have had only a fleeting impact on Rotterdam.

The demands of the oil industry and the needs of shipping companies that require deep access continued to be key to planning and land allocation in the Rotterdam area. A regional plan for West Brabant published around 1969 allowed for a new Shell refinery in Moerdijk and provided space for future expansion (Van der Cammen and De Klerk, 2012). Opening this land for the oil company ultimately led to the creation of a new binding national spatial planning procedure: the ‘national planning key decision’ (*planologische kernbeslissing*) as the site, located in a designated green belt, was in clear conflict with national spatial planning policy, and the parliament decided that such ‘flexibility’ should be curtailed by statutory planning decisions in which the parliament has a final say. The port continued to grow, separating it from the city. Several studies document the overlapping interests of Shell and the Rotterdam Port Authority (Chapman, 1976; Meyer, 1999; Merk and Notteboom, 2013). From the 1970s, pipelines became the main carrier for oil, notably crossing borders towards Antwerp in Belgium and the German Ruhr area (cheaper than train or ship) long before the Schengen agreement provided for the free circulation of people (Boon, 2014). The construction of the pipeline from Rotterdam to the Rhine, instead of from Wilhelmshaven in the north of Germany, was influenced by Shell Netherlands’ intervention (Boon, 2014).

The map from 2000 shows the rapid growth of industrial oil infrastructures. Today, the refineries in Rotterdam have a combined distillation capacity of 58 million tonnes.¹⁰ In the Netherlands, Belgium and Germany another five refineries are supplied with crude oil via pipelines from the port of Rotterdam. Oil production in the Netherlands itself is limited, but ongoing. The enormous impact of the port and its petroleum installations on the spatial development and the environment of the Netherlands and the extent of the port, are rarely visible to citizens. Most recently, the impact of the port

in terms of CO₂ output—about 18% of Dutch emissions are produced by the port of Rotterdam—and its slow reduction have captured the attention of the public.¹¹ Nonetheless, an end of the oil era does not seem in immediate sight—fracking has increased production in the United States—but the fact that the Rotterdam Q8 refinery has been for sale since 2014 indicates changes in the industry.¹² Aging European refineries suffer competition from modern facilities in other parts of the world. For example, the activity of the Kuwait-owned Q8 refinery has relocated to the Middle East raising the question of whether other companies interested in refining will purchase the refinery, or what activities will follow in its footsteps. The ongoing efforts for an energy transition in both the port and city of Rotterdam require awareness of the scale and impact of these installations.

The retail petroleumscape: gas stations

Parallel to the industrial petroleumscape, with its spaces of production and transport that includes elements such as refineries with a long span of life, another petroleumscape emerged that was more short-lived and much closer to the consumer: gas or petrol stations (known in the Netherlands as *benzine stations*). The retail network of oil is so mundane as to generally escape comment. Since the beginning of the twentieth century, retail networks of gas stations have spread throughout cities and rural areas. These structures have evolved over time with the transformation of cars, road infrastructures and user needs. Today, the norm for the Randstad is one petrol station about every 20 kilometres of road.¹³ They can take on a regional flavour, adapt to local urban forms or changing consumer preferences, while boasting the names and colours of oil companies. Their forms are not identical, but they are easily identifiable through their colour and general basic typology (a canopy on stilts), which inscribe the oil companies' names into everyone's mindscape. Unlike other countries, the Netherlands adopted specific aesthetic guidelines regarding the design of gas stations and thus the public face of oil. As places of contact with the consumer, gas stations are ideally suited for brand marketing to adults and children through free toys and other items.

The invention of the light bulb in 1879 and the spread of electric lighting had started to challenge the oil industry, but oil's days were far from over as benzine emerged as the fuel for cars. The first cars entered the Netherlands in 1895, and their owners purchased fuel in pharmacies or in containers from street cars (Aertnajs, 1948). Users carried it in open buckets; later, companies built gas pumps to fill cars and then specialized gas stations (Vieyra, 1979; Boy and De Voogd, 2015). As the use of the car spread in the beginning of the twentieth century, gasoline, formerly a by-product of the kerosene production, saw a major expansion. The next challenge was to dispense the gasoline directly from storage to the car. The Continental Petroleum Company (CPC), part of the Texas (fuel) Company, opted to import pumps from the United States and to have them installed by local entrepreneurs (Van Santen,

2013). In 1907, the first gas station opened in St Louis, and mass fabrication of Ford cars starting in 1913 led to a rapidly growing number of users. The First World War slowed down petroleum activities in the Netherlands, but the rise of the car as a widespread means of transport took the petroleum industry to a new level. Maps of oil-related buildings in the area of Rotterdam and The Hague suggest that no gas stations existed in 1910. The only icon on the map is derived from a postcard that shows the label *De Benzine Automaat* (The Benzine Slot Machine) possibly a predecessor of Standard Oil. There may have been free-standing pumps and depots that the research underlying this chapter has not detected.

Gas pumps with underground storage tanks emerged mostly in places where people could afford to buy or use cars (and they came to serve as an indicator of the presence of such wealth). Shelterless, they often stood alongside the street, sometimes in a line-up of different brands. Before 1940, pumps were often an additional service rather than the core purpose of a business. Hotels, garages, or bike shops would set up gas stations. A well-known picture shows a pump attached to the garage of Willem van Setten near the hotel and restaurant Pabst in Zeist.¹⁴ The map of the Randstad from 1940 suggests that gas pumps and stations appeared first in or near cities. They also indicate that some cities had higher densities of gas dispensers than others. Vehicles did not travel far on a few litres of gasoline until they needed to be refilled, so people must have been going from city to city where pumps were located (or they used rural petroleum depots that the research has not detected). The map of 1940 shows more than ten gas pumps in the capital city of The Hague, where decision-makers of the corporate and public sector congregated and where wealthy people traditionally lived. Photographs of gas pumps in The Hague survive because they were taken as part of applications for permission to install advertisement panels. The mapped locations in The Hague include places where businesses provided gas pumps as a convenience for a rich clientele. Hotel Zeerust on Keizerstraat, near the beach, for example, had its own Shell pump. Garages in the 1920s and 1930s hosted gas pumps and provided rental vehicles. A Shell pump stood near the Thiessens garage on Stephenstraat 92–98 in the centre of The Hague. The building featured multiple garage doors, suggesting that the establishment also provided storage and repair. The map of 1940 suggests that Rotterdam at that time had fewer gas pumps. Although petroleum entered the region through Rotterdam's port, the city was predominantly working class, and therefore there were probably fewer cars.

The European development of the automobile was slower than in the United States, but what started as an elite pastime rapidly spread to a larger population group. Rapidly growing numbers of people clamoured for the construction of car-usable surroundings supporting the interests of the oil companies. Oil companies started to develop an integrated distribution system for the new fuel, building over time a dense network of gas stations in and around the Randstad. Meanwhile, the *Nederlandsche Automobiël Club* (later

(Royal: *Koninklijke*) KNAC) and the Royal Dutch Touring Club ANWB (*Algemene Nederlandsche Wielrijdersbond*, an association founded in July 1883 for bikes), became key players in developing landscapes for driving, even controlling the quality of benzine, developing depots, and organizing benzine resale.¹⁵ By the 1920s, streets were improving and gas stations were popping up as prefabricated objects. Designers rapidly developed gas stations as a new typology, a place where the attendant could find shelter, where people could restart their cars under cover and expect services (hence the name service station) such as cleaning windows and small repairs. Painted in the colours of their company and a promotional tool, these stations were eye-catching and a photographic subject.

Street-side pumps started to occupy public space but they could not satisfy the growing customer base. Safety concerns also arose and led to the construction of pumps on small islands next to the streets. Gas stations that resembled the structures we know now emerged in the United States around 1910. Instead of a shelterless roadside pump, companies built access from the road to a dedicated lot with distinctive new features. It included pumps on an island, a canopy sheltering the employee and customers while the car was being served, and a small building for the employees. Many gas stations in the United States were commercially built structures, but architects also seized the opportunity to design buildings with a new function—creating iconic buildings or fitting them with the architecture of the surroundings. At the time, US gas stations, including ones built by Shell, aimed to attract customers through architectural surprise: they appeared along the road in a range of shapes from a teapot to a sphinx, including a shell-shaped one in North Carolina (Jonker and Luiten van Zanden, 2007). The company had used the Shell name in California since 1912, but it took until 1925 to establish the name and the logo in the Netherlands where gasoline sold under different names, such as Aceylena, Autoline, or Sumatrinegasoline rather than the Royal Dutch name. The rapid propagation of these structures, sited every 10–20 kilometres, brought opposition from Bond Heemschut, an organization established by citizens in 1911 to protect the appearance of the Dutch landscape. Its commission on *De Weg in het Landschap* (The Road in the Landscape) specifically asked provincial administrations to intervene with the oil companies to improve the aesthetics of gas stations (Van Lanschot and Cleyndert, 1939; Segers, 1984). They ultimately succeeded in changing the appearance of the new building type and establishing an ‘aesthetical petroleumscape’ in the Randstad.

In the Netherlands, as car traffic became denser in the 1920s, dedicated gas stations began appearing in urban spaces. The new typology colonized traditional streets and town squares and facilitated new lifestyles. The new architecture allowed the customer—or chauffeur—to drive under a roof and be served—in some places day and night, such as at the Shell Station Rijswijkseweg, which opened in 1928. These new forms for dispensing petroleum needed more space, and at times, construction coincided with street

widening or building. The oil companies in the Netherlands decided to invite local architects to design them. As a result of particular Dutch aesthetic guidelines uniquely designed gas stations heralded the main company's names throughout the Randstad and beyond (many at its outskirts). Starting in the 1920s, petroleum stations became the signboard of the enterprise. The Dutch opted for a functionalist approach and the architect Sybold van Ravesteyn, architect of numerous buildings of the Dutch railway, was among the first architects to design for this new typology in 1935 when he created a (non-permanent) pump island with a roof (Verweij, 1997; Scharlemann and Koudijs, 2005; Rouw, 2014). The aesthetic control exercised in the Netherlands prompted Esso to hire the modernist Dutch architect W.M. Dudok to produce a gas station prototype. He designed a V-shaped construction that sheltered the pump island and allowed for a translucent façade underneath. Over 100 such structures were built from the 1950s to the 1970s. This and other buildings celebrated the advent of oil in spectacular architectural ways and wrote oil into the mindscapes of the general public.

After the Second World War, cars became an everyday mode of travel for a large part of the general population in many industrialized countries, including the Netherlands. Gas stations became even more intimately tied to the freedom of driving and the joy of leisure. Cars, roads and gas stations allowed people to explore and occupy rural areas. They facilitated the expansion of suburban landscapes and new cultural practices. In the Netherlands, new car owners practised so-called 'berm tourism', that is, they held picnics on the side of roads to watch other cars drive by. As people travelled farther and more often, they also celebrated their experiences. Photographs (as well as postcards) of leisure spots and iconic buildings—including the Scheveningen beach with the Kurhaus near The Hague—at times feature gas stations. Characteristic of the 1950s and 1960s is the way in which the sand of the beach sided the asphalt band of the street, and the pedestrian promenade was hemmed in between flowing traffic and parking spaces.

Since these early years, gas stations in the Randstad and the Netherlands in general have seen multiple changes. As cheaper self-service gas stations became dominant, the architecture changed. Marketing wars led to greater attention to logo and colours, and Shell globally adopted a standard banner to surround its buildings. The First National Highway Plan (1927) implemented in the 1960s provided room for more traffic and did so largely outside the spatial planning system (Hoogenberk, 1980; Van der Cammen and De Klerk, 2012). The map of 1970 shows that new gas stations were built together with the streets, occupying rural areas. Changes in car construction allowed cars to cover greater distances; consumers' expectations of what products can be bought in a shop at the gas station, shaped by competition and advertisement, influenced changes in gas station location, form and function that merit further study and evaluation. Small street-side stations vanished as larger gas stations were erected near new highways. Today, the Randstad continues to feature a higher density of gas stations than the rest of the Netherlands.

Despite the availability of public transport in dense cities and in the Randstad in particular, the places where people live and work are those where they also park and refuel their cars. The major cities of the Randstad have a high level of mobility as well as of access to gas stations. A detailed analysis of historical changes of gas stations within cities, their (re-)location over time, and in relation to each other as well as their accessibility, still has to be done. While gas stations are available throughout the country alongside major roads and highways, inner-city gas stations impact urban development and urban form through their traffic, environmental and security impact in ways that still have to be researched.

Compared to the stable and fixed industrial oil landscape, the gas stations form a more flexible and fleeting landscape, albeit one with a strong impact on the mental mindscape of the citizens of the Randstad. Gas stations are designed to be steps along a way, a secure companion on long trips as well as in the neighbourhood. Policy changes in the Netherlands now promote a change from gas-fuelled to electric cars.¹⁶ Recent years have seen changes in oil company strategies. Exxon/Mobil has decided to shut down its Dutch gas stations (while maintaining the logo for some time to come), signalling a change in organization that traditionally aimed to be present throughout the commodity chain.¹⁷ Shutting down gas stations that no longer fit a company's economic model requires interventions from specialists in soil clean-up to allow for new uses as well as from heritage specialists (Van den Anker, 1988). A system of electric cars will not need the gas stations that have become the signboard for oil. And plans will have to be made to adapt streetscapes, building quick electric loading stations while also providing street space for loading. An explosive growth of electric cars may put an end to the free parking spaces that are available for them today in the Randstad. The term *laadpaalklever* meaning someone occupying an electric charging space longer than necessary became the word of the year in 2018.¹⁸ Clearly, a new mindscape is emerging around the spaces of green energy.

The administrative petroleumscape: headquarters

The Randstad is home to major oil-companies headquarters and research centres, establishing yet another face for the oil industry. Separated from the physical streams of oil, companies translate the physical presence of oil administration into more distinctive urban and architectural spaces, creating additional layers of the petroleumscape. In contrast to the gas stations that are present throughout the country but have a largely utilitarian character, oil companies' large administrative and research facilities, notably those of Royal Dutch Shell, are in prestigious locations in The Hague, Amsterdam and Rotterdam. While the presence of the port and transport infrastructure was key to the physical networks of oil, proximity to the national government and its relevant ministries drove the settlement patterns of the oil company headquarters. In contrast to the hidden sites of the oil industry, several

of the administrative and research buildings are urban icons and well-known to locals. Less visible are the additional demands for employee housing, education, or leisure facilities that these activities generate and that often also accommodate other people. They only occupy a small portion of their host cities, but can drive up prices in the housing sector—an effect that merits further study and that is largely excluded in this piece.

The landscapes of production and retail are complemented with administrative and research facilities. Oil companies not only developed the port (and its key infrastructure) and set up a retail system, they also inscribed their interests into a corporate landscape of headquarters. The economic fates of the two systems are closely intertwined, while their spatial location and their visibility are different, industrial buildings on the one hand, monumental ones on the other. In response to the fusion of Royal Dutch with the British Shell Transport Company in 1907, the new company constructed headquarters for the *Bataafsche Petroleum Maatschappij* in The Hague (and in London) as seen in the map of 1910. Over the following decades, the Shell Company expanded its headquarters building (1928–1930) and bought and built several others around it creating an administrative core that is still the company's central location. The company promoted pectons, the symbol of Shell, as part of the ornamental imagery, as seen in several of the buildings in The Hague. Other buildings belonging to the Shell group include Wassenaarseweg 80 erected in 1938–1946 by the leading Dutch architect J.J.P. Oud (Taverne and Broekhuizen, 1995). Today it is a classified monument.

Though Shell sold several of its inner-city locations in The Hague, it held on to its headquarters and recently restored and upgraded them. Meanwhile, Esso sold its former headquarters in The Hague known as the Red Elephant, and the company Spaces uses the building today to rent out flexible office and meeting spaces. The destruction of Rotterdam in the Second World War set the stage for modernist approaches in architecture. The rebuilding around the Hofplein, south of the train station on the way to the redesigned Lijnbaan, provided the space for a 90 metre high-rise featuring the Shell logo on the top and a gas station underneath. The construction of this so-called 'Shell Toren' in 1960 signalled the pressure that a company of this scale can put on the city. As the maps demonstrate, the physical space of the headquarters is minimal, but through their close connection to decision-makers, their impact is huge.

Headquarter location and design remain of iconic importance for the oil companies, but it is ultimately only a small part of their portfolio. The spatial impact of the company is mostly visible in the real estate it owns, but a list of the sites Shell or other companies own does not tell the full story. These institutions, like other global companies, generate a secondary petroleumscape through their demands for housing, schooling, and leisure facilities for their employees. As a global company, Shell employs many expatriates, who expect appropriate educational facilities and other amenities for themselves and their families. Combined with the presence of employees of many other international institutions, their presence also supports the large number of

international schools in The Hague, and the high prices for housing, a topic that merits further exploration. Shell sold much of its housing and today expats typically find housing on the private market.

The representational petroleumscape: maps and booklets

Whereas the first three layers of the petroleumscape are about the physical impact of oil companies on the built environment, their meaning for the general public goes beyond the fuel itself. It includes the construction of space and identity as well as culture in and for spaces far beyond the ones that they actually occupy. These depictions and narratives construct a mindscape of oil that is different from the one that they actually build. In this case, the road atlases, booklets and brochures, and more recently, apps produced by the oil companies link the company logo to everyday practices and Dutch traditions, providing driving and gas station maps, tourist guides, and information on history and technology (including that of petroleum). The status of Royal Dutch Shell as a household name and one might say a national icon, similar to KLM, further increases the power of this company to transform landscapes, through interventions at the governmental level in regard to, for example, pipeline construction or through the transformation of mindscapes and citizen attitudes.

Selective representations and connections between company logos and territory can create novel understandings of space. In their marketing, oil companies have used this power to position themselves in a space that is quite different from the one they occupy. Map-makers have a powerful tool to help users understand space but also to create imagined geographies (Wood, 1992). Atlases, maps, brochures, and booklets produced by oil companies rarely depict refineries or headquarters; instead they tie company colours and logos to traditional landscapes, to tourist destinations, to historical, scientific, or cultural explorations.¹⁹ Since the 1930s, oil companies have used maps to fuel the general public's desire to explore the Dutch landscape (for example: Shell started in 1931, Texaco in 1935). They sold or freely distributed road maps that tied the company name to the experience of driving and visiting. Esso's map of 1957 and other examples show oil companies establishing a relationship between modern technology (streets) and traditional Dutch features: a Dutch windmill appears next to an oversized car and tiny highway on the Shell map.²⁰ Tying the oil companies company to traditional landscapes rather than the industrial ones that petroleum generates, (early) road map covers also promote the car as a means of freedom and discovery. Some maps do show the connection between the physical presence of oil production and maps, notably those made by the City and Port of Rotterdam and by companies who are catering to the refineries, such as engineers, or car rentals. These maps demonstrate the importance of the refineries to the local business community. They depict oil installations, even indicating the refineries by name

and proudly displaying imagery of the refineries. The yearbooks produced by Rotterdam Europoort emphasize the importance of the refineries and of the highway infrastructure that serves the port and the city.²¹

Oil companies also carefully established their images with their own employees and regular customers, once again with a focus on Dutch culture, history, and technology and promotion of driving as a new lifestyle. A full examination of the companies' publications remains to be done, but the *Shell Journaal*—a yearly booklet distributed to its regular clients (not at the gas station), published between 1961 and 1993, and still available on second handbook sites—is suggestive. A common message of these booklets is the historical qualities of the Dutch cities and landscapes as tourist attractions. Other publications include engineering topics: bridges, buildings, themes of trade, and change. A 1989 publication, entitled *Snelweg naar Europa* (Highway to Europe) put forward a vision for the Netherlands as a logistics centre and praised the advantages of petroleum (Van Rooijen, 1989). Another late 1980s series, *Shell helpt u op weg* (Shell helps you on the road), was also geared to a general public as the various volumes highlighted all sorts of tourist and leisure attraction across the country. Originally meant as advertisement objects, these publications have become collectibles sold on Ebay.

To increase customer bonding, oil companies have adopted diverse strategies, producing toy gas stations with company logos, developing board games, or games to play during car rides or bonus cards. They have published car humour books and booklets educating children about urban car traffic. They even organized art exhibitions.²² Overall the publications promoted the idea that companies like Shell were essential to the well-being of the people in the Netherlands. The focus of these publications has changed over time, adjusting to the interests of the general public. They were abundant from the 1960s to the 1990s and have not yet been studied or even acknowledged as an important agent in the construction of modern cities and lifestyles. These publications have since made their way to social media and apps, which are more volatile. Free locator apps direct customers to the company of their choice with information on the services available.²³ Other activities are geared to current issues and questions of sustainability, such as the eco-marathon sponsored by Shell.²⁴ The expansion of shops for articles of daily consumption, the inclusion of coffee bars or free Wi-Fi are all tools that are not related to its core-business but important in terms of image building, as the recent ads of the Shell company demonstrate.

Conclusion

The built environment is shaped by multiple, sometimes opposing functions. Commodity flows tie production and consumption, administration, research, and culture together under a single commodity such as oil, creating parallel, and occasionally intertwined built forms that are rarely (if ever) explored in

conjunction. Some institutions are active in many or all of these domains and transform our built environment on multiple, interconnected scales. Major oil corporations are among these actors. The history of their interventions in urban form documents the revolutionary impact that such institutions can have on the built environment. In several instances, the oil companies generated major changes in the built environment. Examples such as the refinery in Moerdijk and the intervention by the aesthetic commission mentioned above demonstrate that the landscape of oil sometimes sits uneasily with local planning policies and interest, but also that it is powerful enough to generate major changes. Oil companies own huge and expansive structures in the Rotterdam port. These are the core company business, but they are hidden from most viewers. Other built artefacts are closer to the consumer: these include iconic headquarters and functional gas stations. Both structures take up less space and are relatively less costly.

Understanding the changing fabric of the Randstad in light of oil-related structures provides insights on factors external to recognized planning that drive spatial development. Private companies have shaped infrastructure growth, land use, or urban development through their own means without the traditional tools of spatial planning. Through their consumption behaviour, citizens further enhanced or even initiated these changes. Spatial development plans often accommodated these pressures and developments, trying to channel them into comprehensive development for economic growth. The planning of the Randstad was a key theme for national plans and industrialization policies aimed at balancing population growth and notably for the port of Rotterdam. Much of the petroleum development was driven by private actors, but the government accommodated the growth of the petroleum-cape through its support of the development of the port. From the 1950s to the 1980s industrialization policies such as the Deltaplan in 1958, the Seaport Report (*Zeehavennota*) of 1966 and its successor, the Second Structural Scheme for Seaports (*Tweede Structuurschema Zeehavens*, 1989), and the national Fourth Planning Report of 1988, aimed to balance the concentration of industrial and economic forces around the growing port and the desire for decentralization in and of the Randstad. The Delta Plan, for example, proposed separation of port and city and the creation of a Delta-city (*Delta-stad*) to counter traffic problems, to avoid the mixing of working and living areas, to address problems of governance, to reduce the distance to agricultural areas, and to address flood risk issues. This proposal was not realized but led to the establishment of growth centres such as Spijkernisse and Hellevoetsluis (Ministerie van Verkeer en Waterstaat, 1958). Dutch planners anticipated the growth of the Rotterdam port in the *Zeehavennota* of 1966 and proposed to provide additional development opportunities in the Eemshaven area and in Zeeland (Zonneveld, 1991). The concept of the mainport, developed in the 1980s (see Chapter 8) and the recognition of relevant hinterland infrastructures, for example, further strengthened the role of the port as petroleum throughput centre.

The court rulings from 2015 and 2018 requiring the Dutch government to reduce greenhouse gas emissions may indicate a sea change.²⁵ If and when a major change in use occurs, this industrial petroleum landscape will need to be redesigned and reused. This history of how private and public petroleum actors have helped to build the Randstad also raises questions about the changes on all levels of the built environment that new sustainable energy will bring. As the landscape of energy production and consumption changes, it will be necessary to rethink the workings of the Randstad: to what degree is the oil infrastructure geared to transitioning products or to ones that remain in the area? New energy sources, such as biofuels and biochemicals may bring about less concentrated landscapes. The choice of hydrogen for energy generation, however, could continue the current centralization pattern through a reuse of existing gas networks. To what degree local energy transformation impacts the workings of the oil port remains to be seen. Changing local patterns do not necessarily imply that the end of the oil port is in sight (Noorman and De Roo, 2011). It also raises questions on land ownership of refinery sites, responsibilities for their clean up, and the importance of existing and expensive refining structure for the future development of cities.

Notes

- 1 The article draws from material published notably in Hein (2018a).
- 2 125 Jaar Pakhuismeesteren 1818–1943; 1943. Vopak: Our History, <https://www.vopak.com/at-a-glance/our-history> (accessed 10 October 2019).
- 3 ‘Petrolia. Another peep into the hidden land’, *New York Herald*, 14 October 1864, p. 10274.
- 4 [Boston]; Age, published as *The Daily Age* 17 January 1865; Philadelphia, Pennsylvania Press, published as The Press; Date: 06 January 1865; 1; Philadelphia, Pennsylvania.
- 5 ‘Familie de Monchy’ [Family de Moncy], <http://www.top010.nl/html/monchy.htm> (accessed 15 July 2015); Succesvolste havenbaronnen [Most successful port barons], http://www.top010.nl/html/succesvolste_havenbaronnen.htm (accessed 15 July 2015).
- 6 ‘A gigantic monopoly. The standard oil company has practically secured control of the trade of the world’. *Idaho Statesman*, published as *Idaho Daily Statesman*, 01 July 1891.
Neptune kind to him; Article Type: News/Opinion Paper: *Dallas Morning News*, 25 August 1902.
- 7 ‘Favor a rejection. Authorities denounce the proposal to grant the standard oil company privileges’. *Patriot*, 15 July 1891.
- 8 For a map of contemporary oil drilling in the Netherlands, see NAM, Locaties Oliewinning: <https://www.nam.nl/gas-en-oliewinning/aardolie/locaties-oliewinning.html#iframe=L21hcHMvb2xpZS1rYWYWFydC8> (accessed 17 February 2020).
- 9 ‘Woningen Voor Personeel Van De Bataafsche’ [Homes for personnel of the Banier: staatkundig gereformeerd dagblad, 09 September 1935.
- 10 Port of Rotterdam, Oil refineries, <https://www.portofrotterdam.com/en/doing-business/setting-up/existing-industry/refining-and-chemicals/oil-refineries> (accessed 17 February 2020).

- 11 Port of Rotterdam, All roads lead to a sustainable port by 2050, <https://www.portofrotterdam.com/en/news-and-press-releases/all-roads-lead-to-a-sustainable-port-by-2050>; Port of Rotterdam, CO2 Footprint Port of Rotterdam Authority (accessed 17 February 2020), https://www.portofrotterdam.com/sites/default/files/downloads/co2_footprint_en_factsheet-2017.pdf (accessed 17 February 2020).
- 12 Hess wil Rotterdamse raffinaderij Q8 kopen [Hess seeks to buy Rotterdam Q8 refinery], FD 13 April 2015, <http://fd.nl/frontpage/economie-politiek/899643/rotterdamse-raffinaderij-q8-staat-op-de-tocht>; <http://fd.nl/ondernemen/1100174/overslagbedrijf-hes-wil-bieden-op-rotterdamse-raffinaderij-q8> (accessed 3 October 2019).
- 13 Bart van Zoelen, ‘Ouder-Amstel wil bouw benzinstation voorkomen om bomen te redden’ [Ouder-Amstel seeks to prevent the arrival of a new petrol station to protect trees], <https://www.parool.nl/amsterdam/ouder-amstel-wil-bouw-benzinstation-voorkomen-om-bomen-te-redden~bef05f07/> (accessed 17 February 2020).
- 14 *Volgooien maar!!*; Tanken Vroeger en Nu: Geschiedenis van het tanken [Fill it up!!; Tanking then and now; A history of tanking], <http://www.grootveld.net/tankstat/historie.htm> (accessed 17 February 2020).
- 15 Koninklijke nederlandse automobiel club (1938) *40 Jaar K.N.A.C. 1898–1938* [40 Years K.N.A.C.], Jubilee issue of *Auto*, 35 (26 June 1938); *KNAC, CLUB, F. A. K. N. A. 100 Jaar Knac: Clubtocht Door Een Eeuw Heen*, Utrecht, Kosmos-Z&K uitgevers B.V.
- 16 The Dutch administration is carefully tracing the growth of electric vehicles and charging stations: Rijksdienst voor Ondernemend Nederland Januari 2019 Pagina 1/5 Elektrisch Rijden—Analyse over 2018 Elektrisch Rijden—Personenauto’s en laadpunten Analyse over 2018, <https://www.rvo.nl/sites/default/files/2019/01/Elektrisch%20Rijden%20%20Personenautos%20en%20laadpunten%20Analyse%20over%202018.pdf> (accessed 17 February 2020).
- 17 Tankpro, ‘Esso Nederland verkoopt ruim honderd stations aan NRG Value’ [Esso Netherlands sells 100 petrol stations to NRG Value], <http://www.tankpro.nl/specials/2015/02/16/esso-nederland-verkoopt-ruim-honderd-stations-aan-nrg-value/> (accessed 17 February 2020).
- 18 Laadpaalklever is het woord van 2018 volgens Onze Taal. *Het Parool*, 29 December 2018, <https://www.parool.nl/kunst-media/laadpaalklever-is-het-woord-van-2018-volgens-onze-taal~b8bf2306/> (accessed 17 February 2020).
- 19 For map covers and the exception of the Rotterdam refinery map by BP 1970, see Oil Company Roadmaps from the Netherlands, <http://www.petroldmaps.co.uk/country/maps-nl.htm> (accessed 15 July 2015).
- 20 For classic oil company roadmaps from the Netherlands, see <http://www.petroldmaps.co.uk/country/maps-nl.htm> (accessed 17 February 2020). The 2010 final edition of the Shell road led to newspaper articles: <http://www.ad.nl/ad/nl/5597/Economie/article/detail/2424235/2011/04/16/Shell-Stratenboek-verleden-tijd.dhtml> (accessed 17 February 2020).
- 21 Rotterdam Europort, Yearbook/Jahrbuch Information 1983.
- 22 In 1959, Shell Nederland organized: ‘Aardolie-tentoonstelling: van put tot pomp’ [Oil exhibition: From well to pump].
- 23 Esso developed: <http://www.essofuelfinder.nl/>; Shell: <https://www.shell.nl/consumenten/shell-station-locator.html#iframe=Lz9sb2NhbGU9bmxFTkwjL0A1Mi4zMTE4NCw1LjEyNTYyLDh6> (accessed 17 February 2020).
- 24 Shell, Shell Eco-Marathon <https://www.shell.com/make-the-future/shell-ecomarathon.html> (accessed 17 February 2020).

- 25 John Schwartz, 'Ruling says Netherlands must reduce greenhouse gas emissions', *New York Times*, 24 June 2015, http://www.nytimes.com/2015/06/25/science/ruling-says-netherlands-must-reduce-greenhouse-gas-emissions.html?_r=0 (accessed 17 February 2020). See also Climate Liability News, Dutch Court upholds Urgenda; says government must reduce emissions, <https://www.climateliabilitynews.org/2018/10/09/urgenda-netherlands-climate-emissions/> (accessed 17 February 2020).

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